

NEHRP Handbook of Techniques for the Seismic Rehabilitation of Existing Buildings



Issued by FEMA in furtherance of the
Decade for Natural Disaster Reduction.





A Council of the National Institute of Building Sciences

**Program
on
Improved
Seismic
Safety
Provisions**

NEHRP HANDBOOK OF TECHNIQUES FOR THE SEISMIC REHABILITATION OF EXISTING BUILDINGS

THE BUILDING SEISMIC SAFETY COUNCIL AND ITS PURPOSE

The Building Seismic Safety Council (BSSC) was established in 1979 under the auspices of the National Institute of Building Sciences (NIBS) as an entirely new type of instrument for dealing with the complex regulatory, technical, social, and economic issues involved in developing and promulgating building earthquake hazard mitigation regulatory provisions that are national in scope. By bringing together in the BSSC all of the needed expertise and all relevant public and private interests, it was believed that issues related to the seismic safety of the built environment could be resolved and jurisdictional problems overcome through authoritative guidance and assistance backed by a broad consensus.

The BSSC is an independent, voluntary membership body representing a wide variety of building community interests. Its fundamental purpose is to enhance public safety by providing a national forum that fosters improved seismic safety provisions for use by the building community in the planning, design, construction, regulation, and utilization of buildings. To fulfill its purpose, the BSSC:

- Promotes the development of seismic safety provisions suitable for use throughout the United States;
- Recommends, encourages, and promotes the adoption of appropriate seismic safety provisions in voluntary standards and model codes;
- Assesses progress in the implementation of such provisions by federal, state, and local regulatory and construction agencies;
- Identifies opportunities for improving seismic safety regulations and practices and encourages public and private organizations to effect such improvements;
- Promotes the development of training and educational courses and materials for use by design professionals, builders, building regulatory officials, elected officials, industry representatives, other members of the building community, and the public;
- Advises government bodies on their programs of research, development, and implementation; and
- Periodically reviews and evaluates research findings, practices, and experience and makes recommendations for incorporation into seismic design practices.

The BSSC's area of interest encompasses all building types, structures, and related facilities and includes explicit consideration and assessment of the social, technical, administrative, political, legal, and economic implications of its deliberations and recommendations. The BSSC believes that the achievement of its purpose is a concern shared by all in the public and private sectors; therefore, its activities are structured to provide all interested entities (i.e., government bodies at all levels, voluntary organizations, business, industry, the design profession, the construction industry, the research community, and the general public) with the opportunity to participate. The BSSC also believes that the regional and local differences in the nature and magnitude of potentially hazardous earthquake events require a flexible approach to seismic safety that allows for consideration of the relative risk, resources, and capabilities of each community.

The BSSC is committed to continued technical improvement of seismic design provisions, assessment of advances in engineering knowledge and design experience, and evaluation of earthquake impacts. It recognizes that appropriate earthquake hazard reduction measures and initiatives should be adopted by existing organizations and institutions and incorporated, whenever possible, into their legislation, regulations, practices, rules, codes, relief procedures, and loan requirements so that these measures and initiatives become an integral part of established activities, not additional burdens. The BSSC itself assumes no standards-making and -promulgating role; rather, it advocates that code- and standards-formulation organizations consider BSSC recommendations for inclusion into their documents and standards.

BSSC Program on Improved Seismic Safety Provisions

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FOR THE SEISMIC REHABILITATION OF
EXISTING BUILDINGS**

**Developed by the
Building Seismic Safety Council
for the
Federal Emergency Management Agency
Based on a Preliminary Version Prepared for FEMA by
the URS/John A. Blume and Associates, Engineers**

**BUILDING SEISMIC SAFETY COUNCIL
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Building Seismic Safety Council reports include the documents listed below; unless otherwise noted, single copies are available at no charge from the Council:

Abatement of Seismic Hazards to Lifelines: Proceedings of the Building Seismic Safety Council Workshop on Development of an Action Plan, 6 volumes, 1987

Action Plan for the Abatement of Seismic Hazards to New and Existing Lifelines, 1987

Guide to Use of the NEHRP Recommended Provisions in Earthquake-Resistant Design of Buildings, 1990

NEHRP (National Earthquake Hazards Reduction Program) Recommended Provisions for the Development of Seismic Regulations for New Buildings, 1988 and 1991 Editions, 2 volumes and maps, 1988 and 1991

NEHRP Handbook for the Seismic Evaluation of Existing Buildings, 1992

NEHRP Handbook of Techniques for the Seismic Rehabilitation of Existing Buildings, 1992

Non-Technical Explanation of the NEHRP Recommended Provisions, Revised Edition, 1990

Seismic Considerations for Communities at Risk, 1990*

Seismic Considerations: Elementary and Secondary Schools, Revised Edition, 1990

Seismic Considerations: Health Care Facilities, Revised Edition, 1990

Seismic Considerations: Hotels and Motels, Revised Edition, 1990

Seismic Considerations: Apartment Buildings, 1988

Seismic Considerations: Office Buildings, 1988

Societal Implications: Selected Readings, 1986.

Strategies and Approaches for Implementing a Comprehensive Program to Mitigate the Risk to Lifelines from Earthquakes and Other Natural Hazards, 1989 (available from the National Institute of Building Sciences for \$11)

For further information concerning any of these documents or the activities of the BSSC, contact the Executive Director, Building Seismic Safety Council, 1201 L St., N.W., Suite 400, Washington, D.C. 20005.

* An earlier version of this publication was entitled *Societal Implications: A Community Handbook*.